

# Regime Type and Healthcare Systems: A Global Quantitative Analysis

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A thesis presented in partial fulfillment of the requirements for completion  
Of the Bachelor of Arts degree in International Studies  
Croft Institute for International Studies  
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University, Mississippi  
April 2015

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## **Abstract**

This thesis examines the link between regime type and healthcare systems. After reviewing literature that examines regime type, social spending, and healthcare, as well as a more specific example of regime change in Chile, it undertakes a multivariate regression analysis of 183 countries. It concludes that democracies have significantly better healthcare-system indicators, but that environmental variables, such as Latitude and Percentage of Rural Population, are more significant predictors of healthcare. It concludes that, while regime type is an important factor, dealing with ecological and locational problems of a country, such as combating tropical diseases and expanding access to infrastructure, are statistically more likely to affect the size, scope, and efficacy of a country's healthcare system.

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## **Theoretical Framework**

### **Introduction**

Democracies and dictatorships should be as different from each other as night is from day, given their different philosophies of governing. Although there is certainly variation among the two different types and many outliers, one would expect them to behave differently and have different ideologies, particularly relating to the use of state power and the importance of civil liberties and political rights. However, it is important to investigate how these different types of governments fare in meeting the needs of their citizens in order to understand each regime type better and the consequences for their citizens. Are citizens of democracies better-off than citizens of authoritarian regimes because of the inherent character of the government? In particular, does being a democracy have implications for the health of its citizens?

Indeed, studying this certain aspect of the relationship between regime type and health is critical, not only to general scholarship but to our understanding of how to improve healthcare systems of countries and health outcomes of populations. If correlations exist between health and regime type, it gives even more reason to insist on the demise of regimes that abuse the political rights and civil liberties of their populations. However, if none exists, the uncomfortable prospect of working with any regime in power, no matter how repressive, in order to focus on more important factors

involved in changing health and healthcare systems might be shown to be a sound alternative.

This thesis will explore some of the ways the difference in regime type plays out, particularly in regard to health and health outcomes. I will ask two questions. First, is there a relationship between regime type and healthcare systems? And, secondly, are there other factors that more significantly affect healthcare systems than the political factor of the quality of the regime?

To answer these questions, I will first undertake a short review of the relevant literature connecting social spending and health to the political regime type, followed by hypotheses specifically addressing this relationship on a global level. I will test these with a multivariate regression analysis of 183 countries, seeing how several healthcare system indicators respond to democratic and competing variables. I will also relate the discussion of the literature and the results to the experiences of Chile, the site of my study abroad experience. Discussing the recent experience of Chile makes a nice addition to this thesis because it complements the broad, international analysis, discussing the overall results in the perspective of a country that has had recent experience with two very different regime types.

## **Literature Review**

Although not much literature exists connecting regime type to healthcare, there exists some scholarship about social spending on a more general level that can shed light on my questions. One important research agenda details and analyzes the relationship between regime type, in this case dictatorship and democracy, and social spending. First,

on a more theoretical level, Bruce Buena de Mesquita (2002), a prominent political scientist, made an argument based on selectorate theory. He started with two objectives: first, to “examine how political institutions influence the incentives of leaders to allocate resources toward the provision of public goods...and private goods” and, second, to “identify the institutional circumstances in which the incentives facing a leader who wants to stay in office are compatible with the provision of effective public policy” (2002: 559). He and his co-authors identified two specific variables that they think influence the provision of public and private goods, size of the selectorate,  $S$ , and the size of the winning coalition,  $W$ . The selectorate they defined as “those in society who hold the power to remove the incumbent and select her replacement,” while the winning coalition is defined as those whose loyalty the leader must hold to stay in power (Buena de Mesquita 2002: 561). The relative sizes of each, they said, change with the type of political system: autocracies usually have small winning coalitions relative to their selectorates, while democracies have large ones. Public goods they defined as goods that benefit all members of the population equally (like clean air and national defense), while private goods specifically benefit those to whom the good is given (defense contracts and corruption payments, for example).

The authors created a mathematical model to test specifically how the size of  $W$  within  $S$  affects the way a leader,  $L$ , stays in power through the provision of public and private benefits. They reviewed many scenarios and examined how leaders make decisions, given varying sizes of  $S$  and  $W$ . They come to several conclusions. First, they conclude that “it is easier for autocrats (leaders with small coalitions) to survive in office than democrats (leaders with large coalitions)”, noting that this difference “stems from

differences in the relative importance of private and public goods” (Buena de Mesquita 2002: 580). Autocrats, who by definition of regime type have smaller winning coalitions, can more effectively buy the support of W by providing private benefits. Democrats, however, would soon go bankrupt to try to retain their winning coalition this way, as W is so large: thus, public goods are a more efficient method for their political survival. Indeed, they also came to a conclusion about institutions in general. “In particular, because democrats rely on large winning coalitions, they must provide more public goods than those who depend on small winning coalitions” (Buena de Mesquita 2002: 581). Although the authors do not specifically mention healthcare, this research has huge implications for my questions. Democratic and authoritarian leaders should approach healthcare differently based on their preferences for providing public and private goods; democrats would be more likely to provide large-scale public healthcare systems, a public good, while authoritarians would more likely prioritize spending for private benefits, like a healthcare system only accessible to the political and social elite.

Another set of scholars set about to look at this relationship more from the results, rather than motivation for social spending. Pribble, Huber, and Stephens (2009) looked at countries in Latin America to examine what they call the determinants of poverty. Highly critical of the Washington Consensus<sup>1</sup> and a growth-based approach to looking at poverty reduction, they instead looked at the influence of politics and “domestic political factors such as the nature of parties, regime type, and the institutional structure of the state” (Pribble et al. 2009: 389). They hypothesized that the “ideal-typical political sequence,”

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<sup>1</sup> A trend embraced in the early 1990s promoting liberalization of markets and free trade, among other things. The Washington Consensus had huge impacts in Latin America, where both leaders, like Chile’s Augusto Pinochet, and international organizations like the IMF, advocated its adoption in restructuring national economies away from more statist trends common in the 60’s and 70’s.

is “an extensive experience with democracy, with the emergence of a left-of-center party that gains control of the legislative and executive branches, and the subsequent reformulation of social programs in a way that places expenditure emphasis on human capital formation and [efficient] transfer payments.” (Pribble et al. 2009: 393). In this situation, there would be more effective poverty reduction, while the absence of some or all of these factors will be less efficient.

To test their hypothesis, they undertook a regression analysis, with poverty defined as a percentage of households living under the ECLAC<sup>2</sup> poverty line as their dependent variable, with that data set including country-specific data from 1968-2001. For independent variables, they used several control variables that account for both economic and social explanations, as well as political variables measuring different aspects of government social spending, the survivability of democracy, and the ideological tendencies of governing institutions. Particularly, they measure democracy from Rueschemeyer, Stephens, and Stephens’ analysis of regimes in Latin America and the Caribbean. They create variables that measure political parties and their survivability and ideological outlook using Michael Coppedge’s project that coded parties that “contested elections for the lower houses or constituent assemblies in eleven Latin American states” (Pribble et al. 2009: 396). Finally, they used country studies to code countries based on the presence of highly repressive authoritarian regimes.

After running the test, they came to several conclusions. First, they confirmed that their ideal-typical political sequence performs best in poverty reduction. They discussed various conclusions from the results of every variable they tested, some of which have

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<sup>2</sup> Economic Commission for Latin America and the Caribbean. ECLAC is a regional commission of the United Nations that seeks to contribute to both poverty reduction and economic growth in Latin America.



very important implications. They found that the presence of democracy positively and significantly affects poverty reduction, as does the presence of a left-leaning rather than right-leaning political program. They also found that education policy and direct cash transfers to poorer citizens have significant effects on poverty. They conclude strongly that there is a “significant impact of partisan power and regime type in shaping differences in poverty levels” (Pribble et al. 2009: 403).

Yet more specifically, scholars have addressed the relationship between regime type and health outcomes in society. Muntaner, Borrell, Ng, Chung, Espelt, Rodriguez-Sanz, Benach, and O’Canpo (2011), in an article for the journal *Sociology of Health and Illness*, conducted what can be termed a review of multiple comparative studies on political systems and health. The purpose of their article, rather than come up with more original research on the subject, is to “describe the emerging area of politically-oriented, empirical studies in the population health literature” (Muntaner et al. 2011: 947). This is significant: instead of trying to find very specific evidence relating to one small aspect of the relationship between democracy and health, they were looking for the big picture reflected in the totality of scholarship on the subject.

In terms of methods, they searched several large publication databases, such as *Sociological Abstracts*, *PubMed*, and *ISI Web of Science*, for key words such as “democracy, welfare regime....AND health, health services, population health” (Muntaner et al. 2011: 949). After sifting through all the results to find seventy-three studies they determined to be fully relevant, they coded them based on year of publication, study objectives and hypotheses, study design, unit of analysis, political variables, health outcomes, and main findings. They were also coded based on the

direction of correlations of the empirical findings and their statistical significance. All the coded data were analyzed with basic descriptive and cross-tabulated statistics (Muntaner et al. 2011: 953)

They concluded, “politics appears to have a positive effect on population health with leftist and egalitarian political traditions producing the most affirmative results. Advanced levels of democracy are consistently related to better population health...” (Muntaner et al. 2011: 954). They also find various levels of positive association between welfare states and population health and health inequalities, and “some evidence of deleterious effects” (Muntaner et al. 2011: 954) from globalization.

Thomas Zweifel and Patricio Navia (2000), too, add quantitative support to these conclusions. They wrote their article “Democracy, Dictatorship, and Infant Mortality” in an environment of competing academic arguments about the effects of regime type on the wellbeing of a country’s citizens. Three different schools of thought prevail, one that holds that “democracy facilitates economic and social development” (Zweifel and Navia 2000: 100), another that holds the opposite, that democracy hinders these important aspects of growth, and a final school that holds that regime type has no real impact. Zweifel and Navia favored the first, particularly because they find problems with the assumptions given to support authoritarian advantage in provision of healthcare: they admonish, “the capacity for unilateral action does not inevitable foster the development of administrative infrastructures needed to provide public goods” (Zweifel and Navia 2000: 101). They sought to use the Infant Mortality Rate (IMR) to lend support to it, especially given that the IMR is closely tied to hunger as well as health indicators.

In terms of data and methods, they use the ACLP<sup>3</sup> data set that contains periodic IMR data for 138 countries specifically from 1950-1990. To balance for the fact that typically most democracies are richer and more developed than dictatorships, they used what is called the Heckman Two-Step method to predict a fictional IMR, where all the democracies dictatorships and all the dictatorships democracies: they “assume that every democracy observed in a given year existed simultaneously as a dictatorship, and vice versa” (104). They separate the cases by GDP per capita (\$1000-\$6000, in increments of \$1000).

They found that “infant mortality points to a clear pattern: With virtually no exceptions, democracies make their inhabitants better off than do dictatorships” and that “democracies have lower levels of infant mortality than dictatorships at every level of per-capita GDP” (Zweifel and Navia 2000: 109). They call it speculation, but they offer one tentative reason for this decisively clear trend. They say, “democracies are likely to provide their citizens with a wider array of opportunities. Opportunity may take many forms, including access to education, freedom from absentee landlords, the absence of war, the provision of credits and income, the freedom to space births, or simply a cow of one’s own. Opportunity gives people greater power to shape their own destiny, enabling them to be more self-sufficient” (Zweifel and Navia 2000: 109).

Lastly, not only are there correlations between health and regime type; there is also evidence to suggest that higher levels of political inclusion and democratic governance within democracies are tied to better health outcomes. Thomas Fujiwara (2011) pointed to Brazil’s use of electronic voting as a factor in recent gains in maternal

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<sup>3</sup> Dataset created by Alvarez, Cheibub, Limongi, and Przeworski that contains political and economic data intended to shed light on formation and durability of democracies.

health in several states. Describing the literature on the economic and social effects of enfranchisement as “mixed and puzzling,” Fujiwara’s research agenda was to show clearly “how improving the political participation of less educated voters can advance policies targeting them and affect their outcomes” (Fujiwara 2011: 1). The assumption is that politicians will be more responsive if barriers to voting are removed, especially to lower-income populations. He used data from the 1998 election when electronic voting (EV) was widely introduced in Brazil. Election rules specific to only this election mandated that only states meeting a certain population threshold, specifically 40,500 voters, could use EV; this situation of differential implementation across states created the conditions to examine the effects of EV. He used a regression analysis to determine the effects of the election system on voting, and then employed several complicated mathematical models to determine the identity of voters who were enfranchised under the new voting system. He analyzed the use of the public healthcare system by uneducated mothers and birth data from the time period surrounding the change to EV.

Fujiwara concludes from his results that EV “promoted the de-facto enfranchisement of mainly less educated voters” (Fujiwara 2011: 32). Crucially, it also “increased government spending in a service that particularly benefits less educated voters: health care...and had effects on its utilization and outcomes, increasing the number of prenatal visits and reducing the number of low-weight births by less educated mothers”(Fujiwara 2011: 32). Very clearly, the literature shows that not only regime type but also level of political inclusion affects health and health care issues.

Scholars have thus studied the relationship between regime type and social spending not just on a global level, but regional level in Latin America as well. Although

not all countries being analyzed in this investigation are from Latin America—indeed, a majority are not—an analysis of the scholarship of democratic transition in this region is useful, not only because it is my chosen region of study, but also because it has been a region that has seen high levels of regime change, mainly from dictatorship to democracy, in the past 20-30 years, rivaled only by the early nineties in Eastern Europe.

David Brown and Wendy Hunter (1999), examined the ways democracies and authoritarians react to economic constraints. Writing in a time when many scholars de-emphasized the influence of regime type on social spending, they proposed directly testing the relationship between regime type and social spending in the period from 1980-1992, when “many Latin American countries faced severe economic problems and underwent regime transitions that gave military and business elites unprecedented political influence” (Brown and Hunter 1999: 780).

To test this, they examined a time-series, cross-sectional data set with observations from each country. To test whether democratic and authoritarian governments differ significantly in their responses to economic stimuli, they employed an “analysis of covariance” statistical model, with social spending per capita as the dependent variable and multiple economic indicators as complementary independent variables, including GDP per capita, Annual Percentage Growth in GDP, Debt Service Ratio, and Inflation, as well as a competing independent variable of Percentage of Population over 55. They categorized countries as democratic or authoritarian based on a measure developed by Alvarez, Cheribub, Limongi, and Przeworski, which itself is based on Robert Dahl’s 1971 classification.

From their regression analysis, they concluded that there exists a “clear and distinct pattern” between democracies and authoritarians. “Social spending in authoritarian regimes is relatively more sensitive to economic constraints, while in democracies it is relative more sensitive to political pressures” (Brown and Hunter 1999: 748). Although they suggested that still much more research needs to be done to determine how both democracies and authoritarians are spending these resources and which groups of the population are receiving them, their results clearly suggested that structural factors in regime type affect social spending in Latin America.

Kent Eaton (2001) adds to this idea of democracies being more responsive to their constituent in terms of social spending. Noticing a recent trend of Latin American experimentation with revenue decentralization, he examined the history of Argentina over the period from 1934-1999, specifically asking whether democratization or the election of democratic officials coincides with devolution of tax revenues to lower, democratically elected levels of governments. His hypothesis reflected this; he hypothesized that democratization is indeed associated with decentralization. He chose to focus on Argentina specifically to avoid having to account for the “cross-national variation...of wealth disparities...and the types of political parties and electoral rules employed in each” instead looking at “cross-temporal variation” (Eaton 2001: 2).

After closely detailing each political administration in the 1934-99 period in Argentine history, examining the character of each regime and their attitudes and actions toward decentralization, he came to the conclusion that “with respect to the democratization hypothesis, the historical record in Argentina confirms the more general finding in the contemporary period that the democratic election of subnational officials

unleashes a powerful force for decentralization” (Eaton 2001: 16). This equally confirms a link between structural factors of regime type and social spending in Latin America: decentralization of government funds presumably puts financial resources closer to the recipients of social services, making it more likely that the quantity and quality of social services increase. Decentralization, in itself, is a response to citizen desires, so this adds to the mounting evidence for political responsiveness being beneficial to the welfare of citizens.

Lastly, DeRouen and Heo (2001) complement the two previous authors. They look at military dictatorships in Latin America with a critical eye to their success at modernization. After detailing several schools of thought on ways to approach the way the military in Latin America affected the economy and economic growth, they observed that “empirical findings from these previous studies lack consistency” (DeRouen and Heo 2001: 481). To fill this gap in knowledge, they “propose[ed] and test[ed] a model capable of assessing the military’s role as modernizer in eighteen Latin American cases over time and cross nationally” (DeRouen and Heo 2001:481).

They create what they call “a non-linear defense growth model” which takes into account what they see as the different avenues of growth for military economies, which they divide into three sectors “military, non-military, and private” (DeRouen and Heo 2001: 482). They create a model based on Robert Solow’s “Technological Change and Aggregate Production Function,” which takes inputs of both economic and labor variables: they use economic and labor data from the IMF. They employ a “two-tiered research design” of, first, panel estimates and, second, individual longitudinal analysis, to capture both inter-country variation and variation over time.

Looking at the results of the statistical tests, DeRouen and Heo conclude that “technological progress in the region has indeed had a positive impact on growth,” while “military spending, by contrast, has thwarted growth” (DeRouen and Heo 2001: 496). Indeed, they go even further, concluding that “the military sector of the budget in Latin America has not made great strides in modernization since the early 1960’s” (DeRouen and Heo 2001: 496), owing this to the fact that counter-insurgency spending makes money spent on the military inefficient, as it could be much more productive spent on projects like public works or education. In general, their results confirm the relationship between social spending and regime type in Latin America, if only as a foil to research detailing the performance of democracy; it is clear from their research that military spending is a much less efficient way to improve the economy in Latin America than other methods, like technological progress.

## **Hypotheses**

Given all the scholarly treatment to this subject, I can come up with two hypotheses to test my questions.

- I) Regime type will correlate with improved healthcare system indicators.
- II) Regime type will be more statistically relevant than other variables in explaining variations in healthcare systems.

## **A Chilean Flavor**

Before moving on to the methodology, tests, and analysis of the hypothesis, this investigation nevertheless could benefit from being rooted in the story of one particular



place as well as the data of many. Thus, I will imbue this thesis with the flavor of Chile's story, in the way its government and healthcare system in particular reacted to changing climates of civil liberties and political rights during the most recent experience of democratic transition in the late 1980s.

In the case of Chile, the armed forces, led by General Augusto Pinochet, moved against the polarizing civilian government of Salvador Allende in a 1973 coup d'état. After several years of brutal consolidation of power that included many "disappearings" and civil rights abuses, the Pinochet government wrote a new constitution in 1980, embarked on drastic neo-liberal economic reforms, privatized much, though not all, of state holdings not beneficial to the military. After several years of boom-and-bust economic performance and substantial protests in the mid-to-late 1980s, Pinochet was defeated in a 1988 plebiscite, following a successful campaign by the coalition opposition "Concertación por el No." There was a transition to democracy, and Patricio Aylwin was sworn in as president in 1990. Although the country transitioned to civilian rule, it is important to note that Pinochet and the military remained extremely influential; the military was guaranteed a certain number of seats in the Congress and Pinochet continued as commander of the armed forces and then as senator for life (Constable and Valenzuela 1990).

The story as it relates to the healthcare system is harder to tell, but there is some literature on healthcare under and after its dictatorship. Unger, Paepe, Cantuarias, and Herrera (2008) assess Chile's healthcare infrastructure from the 1973 coup to 2005, paying a particularly close eye to the neoliberal reforms pushed through under Pinochet's government. They argue that, although Chile's reform has been held up as a model for

other countries undergoing similar processes of health overhaul, the reforms created a system with serious flaws that still remain.

In 1979, Pinochet's government "embarked on a sweeping health sector reform based on neoliberal doctrines" (Unger et al. 2008: 542). Particularly, they took the old, completely public health care system developed over previous regimes and changed it to a dual public private system made up of two separate, parallel administrations, ISAPRES, the private, and FONASA, the public. ISAPRES offered health care insurance based on an employer-contribution system, while FONASA functioned as a public system mostly used by those who could not afford the higher prices of private insurance. According to the authors, the duality of the system created several effects, including negative effects on income inequality and inequitable access to quality health providers for those in the public system. Also, the ISAPRES system "hardly contained costs," as the system was "never intended to do so...and [its companies] have few incentives to be efficient buyers of health services for their clients" (Unger et al. 2008: 545).

With democratization, financing of FONASA, the public health component, increased substantially, as public healthcare spending data makes clear. However, the authors point out that "the democratic regime did not modify the essence of Pinochet's reform...[and] key features...still exist" (Unger et al. 2008: 546). Although Chile has fairly good health indicators for its GNP and size, they attribute this to the growth rate and successful reduction in poverty instead of the healthcare system itself. However, it must be noted that the new, democratic regime behaved in the way hypothesized by my paper; they have been more responsive to citizen demands, and this can be seen in increased funding in FONASA during the democratic regime, among other things.

The story of Chile as it moved from military dictatorship to democracy reflects the literature well. Ultimately, Pinochet and the democratic governments under Aylwin, Frei, and Lagos that followed behaved fundamentally differently because of the institutional structures and their accountability to the populace (or lack of it). Pinochet could push through the drastic neoliberal reforms in the late 70's and early 80's because he did not consider himself constrained by, or responsible to, public opinion; the following democratically-elected presidents, on the other hand, increased funding to FONASA precisely because it was the will of the people who elected them.

## **Methods and Data**

### **Data**

I will now undertake a brief description of my data and case selection. First, my dataset includes data for nearly all of the 191 countries listed in the Freedom House report for 2008. I chose to analyze the data from the year 2008 for a simple reason: it was the most recent year for which the necessary amount of data was present. More recent years had data available for some indicators, but not for all countries, and definitely not to the same extent as was present for 2008. Even so, I excluded 8 countries due to the unavailability of data for Healthcare Spending and Physician Density. The excluded countries are Liechtenstein, North Korea, Somalia, the Palestinian Territories, Zimbabwe, Argentina, Jamaica, Myanmar, and Syria. These exclusions warrant discussion as to any possibility of their exclusion skewing the results: indeed, many of them have either undemocratic regimes or failed states. However, given that there is plenty of other variation present in my dataset among regime types, this exclusion should not have a significant effect. Indeed, it might actually help improve the quality of my dataset, as any data coming out of these countries, with the exception of Liechtenstein, Argentina, and Jamaica, is most likely less reliable because of the nature of the ruling regime, or lack thereof.

Before continuing on to my variables, a discussion of the case selection is warranted. A possible critique of including such a wide range of countries -- from nearly failed states, like Iraq, to incredibly safe and prosperous ones, like Norway, -- is the wide

gap of conditions between the two could make any comparison between them irrelevant. Why not select a similar group of countries and do a more small-scale and focused comparison? The reasoning behind my inclusion of as many countries as possible is that selecting countries of similar conditions would inevitably limit the range of variation of political rights and civil liberties between them. As the purpose of this thesis is to investigate the link between regime type and health, it is not only useful, but imperative, to have as wide a range as possible.

Having established my case selection, I will now turn to describing how I will measure my dependent variable of healthcare system. I have three indicators that, in conjunction, should give a fairly accurate picture of a country's healthcare system: Infant Mortality Rate (IMR), Healthcare Spending as a Percentage of GDP (HCS), and Physician Density (PD). Each of these indicators measures the character of a different part of the healthcare system: its effectiveness (IMR), government and private investment (HCS), and its depth and pervasiveness (PD). I detail each indicator below. The data for each variable, independent or dependent, comes from 2008, as that was the most recent year with consistent data available.

The Infant Mortality Rate indicator is obtained from the World Bank, which defines it as “the number of infants dying before reaching one year of age, per 1,000 live births in a given year.” Accordingly, the scale is infant deaths per 1,000. The World Bank gets these numbers, it says, from “estimates developed by the UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA Population Division),” and I obtained these numbers through the Data section of [Worldbank.org](http://Worldbank.org).

Infant Mortality, although ultimately an indicator of health outcomes, is very useful for analyzing the effectiveness of healthcare systems because of all the factors that affect it. According to the *Encyclopedia of Infant and Early Childhood Development*, IMR is a reflection of the provision of “inexpensive [but important] measures such as nutritional support to the pregnant mother, access to clean water, immunization against childhood infectious diseases, provision of a skilled attendant at birth, treatment of diarrhea and dehydration with oral rehydration fluid, and implementation of malarial control measures” (Andrews et al. 2008, 343). It is logical, then, to assume that countries with lower infant mortality rates have healthcare systems that are more able to provide maternal, pediatric, and, crucially, preventative care to larger portions of their populations than those with higher IMRs.

Healthcare Spending as a Percentage of GDP (HCS) is another indicator obtained from the World Bank. The organization defines it as “the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.” The scale is in constant 2006 USD, but is represented as a percentage relative to a country’s overall GDP. The World Bank obtained these numbers from the World Health Organization Healthcare Account database, and I received this data from the Data section of [Worldbank.org](http://Worldbank.org).

The logic for including HCS as an indicator of healthcare systems is simple: countries that spend more on their healthcare systems relative to their overall economic wealth should prioritize health to a higher degree. Countries that prioritize their healthcare should logically have better and more accessible healthcare systems.

Lastly, Physician Density is the third measure of my dependent variable. It comes from the World Health Organization, which defines it as the “number of physicians relative to the size of the population.” Accordingly, the scale is in physicians per 1000 population. According to the WHO, it is compiled using 4 major sources: population censuses, labor force and employment surveys, health facility assessments and routine administrative information systems.” I obtained this data from WHO.int, specifically from its Indicator and Measurement Registry. It must be noted, though, that this data is closest estimation: the WHO dataset contained data for every country, but for 2008, in several cases data was not available. Thus, if no data was available for 2008, data from the closest year was used. Most data lies within 3-4 years of 2008, which should not cause significant skewing of the results, as there should not be dramatic differences in the number of doctors in such a short range of years. The largest difference between collection year and 2008 was 8 years.

The more physicians there are in a country relative to its population, the more patients they should be able to see. Thus, the assumption is that a country with more physicians will have fewer citizens out of reach of medical care and, thus, a deeper and more pervasive healthcare system. This assumption is certainly not perfect, because other factors such as healthcare costs also affect citizens’ ability to see a doctor. However, on a global scale, the assumption that more physicians per capita leads to more pervasive healthcare access is not an unreasonable one.

In addition to the three dependent variable measures, my dataset includes six independent variables, with one main variable, Freedom House’s Freedom Rating, and five other competing independent variables, GDP per capita, Latitude (Absolute Value)

of Capitals, Major Episodes of Political Violence in the Preceding Ten Years, Rural Population as a Percentage of Population, and Net Official Development Assistance Received as a Percentage of Population. I will expound on each of these in the section that follows.

My main independent variable is the Freedom House Freedom Rating (FHR). It is an indicator that measures the political and social climate of a country with a particular eye towards political and civil freedoms. Freedom House, founded in New York in 1941 and co-chaired by Eleanor Roosevelt, describes itself as “an independent watchdog organization dedicated to the expansion of freedom around the world” (Freedomhouse.org: “About Us”). Since 1972, it has conducted a yearly survey of global civil liberties and political rights, *Freedom in the World*, from which comes its annual Freedom Rating for 193 countries. The Freedom Rating is an average of two sub-scores, the first for Civil Liberties, defined as the ability “to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate” (Freedom in the World 2008). The other is Political Rights, defined as “freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state” (Freedom in the World 2008). These two indicators are then averaged to get the Freedom Rating. The scale of the indicator is from 1-7, with 1 indicating most free and 7 indicating least free. Thus, a lower number indicate a more democratic regime, while a higher number indicates a more authoritarian one.



The data were collected by Freedom House and are a result of surveys given to a team of 33 analysts and 16 senior-level academic advisors, some in the New York and others abroad. Each expert answers twenty-five questions, ten on political rights and fifteen on civil liberties. The raw scores are compiled and the total scores are used to rank the countries. I obtained the data from the “Freedom in the World: 2008” report found at [Freedomhouse.org](http://Freedomhouse.org). It must be noted, for full disclosure, that Freedom House “operates from the assumption that freedom for all peoples is best achieved in liberal democratic societies” (Freedom in the World 2008).

Based on the context of the literature review and my hypotheses, as the Freedom House score decreases, one would expect the healthcare system to get better: that is, the infant mortality would fall, and physician density and healthcare spending would increase.

My first competing independent variable is GDP per capita (GDP). I obtained this data from the World Bank, which defines the indicator as the “gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.” Its scale is in thousands (1,000) of constant 2005 USD. I obtained the data from the Data tab of [Worldbank.org](http://Worldbank.org).

I selected this competing variable to test whether the economic strength was a more significant determinant of health; indeed, in my research, many studies seemed to suggest this. The logic makes sense: more money, more investment in health. One would

expect that, as GDP per capita rises, healthcare would improve. In addition, including this variable in the analysis controls for the correlation between health of citizens and economic strength of countries.

My second competing independent variable is the Absolute Value of the Latitude of each country's capital city. This is simply a measure of the relative distance of each country's capital city from the equator, and the scale is in degrees, measured to a certainty of  $\pm 0.5^\circ$ . I obtained the *Atlas of the World*, 2007 ed. I selected this variable to examine whether geographical location has a significant impact on health. Latitude is an indicator that captures a lot of variation in a country's physical environment. The climate, the ecological surrounding, and, specifically, the prevalence of tropical diseases all vary with latitude. It is a clumsy indicator—many other things besides the ones listed above change with each degree of latitude—but it is still useful in assessing the degree to which the climatic and ecological surroundings affect health.

The third competing independent variable is Major Episode of Political Violence in Preceding 10 Years (PV). The data comes from the Virginia-based Center for Systemic Peace and is collected annually by its director, Dr. Monty G. Marshall, former Director of Research for the Center for Global Policy at George Mason University and the director of the Polity IV project, which “provides annual assessments of autocracy, democracy, and regime transitions”(“About,” [systemicpeace.org](http://systemicpeace.org)). According to the Center, “a Major Episode of Political Violence involves at least 500 ‘directly-related’ fatalities and reaches a level of intensity in which political violence is both systematic and sustained (a base rate of 100 ‘directly-related deaths per annum’).” The scale is binary: 1 represents the presence of a Major Episode in the years 1998-2008, while 0 represents the absence of an

event. I obtained this data directly from the Center for Systemic Peace's website. This indicator was selected to give an indication of the effect of conflict on healthcare systems: countries with active conflicts should see worse healthcare system indicators, as resources would be diverted away from health services to the more immediate costs of conflict, not to mention the enormous toll, both in injuries and in the disruption of preventative care, that conflict takes on populations.

The fourth competing independent variable is Rural Population as Percentage of Population. I again obtained this data from the World Bank, which defines the rural population as "people living in rural areas as defined by national statistical offices. It is calculated as the difference between total population and urban population." The scale is between 0 and 100%. I obtained the data from the Data tab on Worldbank.org. This variable was selected to see whether the degree of urbanization, and, by extension, the degree of centralization of provision of goods and services, has any impact on healthcare systems. One should expect to see lower percentages of rural population (or higher percentages of urban population) associated with better healthcare outcomes, as people are more likely in places where they can have access to healthcare resources. I decided to include Rural Population as an indicator for the same reason as Latitude: it is a measure of the conditions that citizens live in, although this indicator measures societal and infrastructural conditions rather than climactic and ecological ones.

The last competing independent variable is Net Official Development Assistance Received per Capita. The data comes from the World Bank, which adds, "Net official development assistance (ODA) per capita consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the

members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients; and is calculated by dividing net ODA received by the midyear population estimate. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent).” The scale is in Current USD. I obtained this indicator from the Data tab on Worldbank.org. I chose this variable to assess whether economic strength is a factor in determining healthcare system strength; this indicator is sufficiently different from GDP, though, because it measures wealth coming from an external source, rather than a domestic one. The assumption is that higher levels of official development assistance would boost the resources a country has to spend, increasing healthcare spending and ultimately outcomes.

As a refresher, I had two hypotheses:

- I) Regime type will correlate with improved healthcare system indicators.
- II) Regime type will be more statistically relevant than other variables in explaining variations in healthcare systems.

My mix of variables is well suited to analyze these two hypotheses. First, the dependent variables effectively cover several crucial aspects of healthcare systems, health outcomes (the IMR), investment (Healthcare Spending), and the depth and pervasiveness of the system (Physician Density). Second, my main independent variable, Freedom House Rating, is a good choice because it approximates, in a clear and systematic way, the democratic nature of every regime worldwide. Finally, my competing variables offer several other plausible and varied alternatives to put my main independent variable in context.

## Methods

To test my hypothesis, I ran three multiple-regression analyses, one for each dependent variable measurement using SPSS software. The program uses a least-squares fit, determining the equation of a line that minimizes the variance between data-points. Not only does it determine the line, but also calculates standard error, from which confidence intervals and p-values are calculated. From that result, I compared the strength of the correlations between the dependent variables and both main and competing independent variables.

In the analysis, I look at several things in particular. First, I examine the  $R^2$  value of each of the regressions. The  $R^2$  value measures how well the artificial line drawn by the regression analysis fits all of my points: the closer each data-point is to the line, the higher the  $R^2$  value. Thus, the  $R^2$  value measures how well my trend line fits the actual data set. A higher value indicates the presence of a real correlation, while a lower value, below .2 or .3, casts some doubt on the reliability of the correlations found by the model.

Second, I carefully note statistical significance. The regression model calculates the probability that each correlation between variables is due to chance: a lower probability (p) that it is due to chance, below .01, or 1%, for instance, indicates that there is only a 1% chance that the independent variable's effect on the dependent variable is due to chance. I evaluate each of my variables on their statistical significance and the degree of the significance is displayed using asterisks next to the coefficient; one asterisk (\*) shows statistical significance (p is less than 1%), while three (\*\*\*) signifies a very significant result (p is less than 0.1%). This matters primarily because only variables that

are statistically significant are statistically relevant predictors of the dependent variable indicators.

Lastly, the coefficient of the correlation is important: the coefficient indicates the magnitude and direction of the independent variable's effect on the dependent variable. A coefficient of 2 signifies that for every one-unit rise of the independent variable, there is a two-unit rise of the dependent variable. A coefficient of -2, on the other hand, means that for every 2 units the independent variable falls, there is a 1 unit rise in the dependent variable. I will note here that only statistically significant coefficients will be discussed: although the lack of statistical significance of a variable is important in and of itself, the coefficient is irrelevant.

## Results and Analysis

### Results

Table 1: Infant Mortality

Dependent Variable	Independent Variable	Unstandardized Coefficient	Standard Error
<b>Infant Mortality Rate</b>	<b>Freedom House Rating</b>	2.462*	(-0.909)
	<b>GDP per Capita<sup>†</sup></b>	-0.0513	(0)
	<b>Latitude</b>	-0.44***	(0.103)
	<b>Presence of Political Violence</b>	10.514*	(3.716)
	<b>Rural Population</b>	0.408***	(0.078)
	<b>Official Development Assistance per Capita</b>	-0.005	(0.006)
		R <sup>2</sup>	0.502
		F	31.593

\*p<.01; \*\*p<.005; \*\*\*p<.001

All three analyses came back with interesting results. First, Infant Mortality Rate (IMR). When run with all the independent variables, four of the coefficients were significant, the Freedom House Rating, Political Violence, Latitude, and Percentage of Rural Population: the latter two were highly significant. Freedom House scores, Political Violence, and Rural Population all had positive multiple-regression coefficients with the IMR. For every one-point rise in the Freedom House Rating, the IMR rose 2.4 deaths per 10,000 births, holding constant all other independent variables, and for every percentage

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<sup>†</sup> The scale has been adjusted to make the result more understandable. The original regression was performed with a scale of \$1 USD, instead of \$1,000: the original regression coefficient was  $-5.13 \times 10^{-5}$

rise in Rural Population the IMR rose 0.41 deaths per 10,000. Latitude, however, has a negative multiple-regression coefficient; for every degree fall in latitude, the IMR rises 0.44 deaths per 10,000, holding constant all other variables. The  $R^2$  value is fairly high, signifying that the model fits the reality of the data fairly well.

These results are noteworthy for several reasons. First, Freedom House Score is confirmed to be a statistically relevant predictor of a healthcare system indicator. This supports my first hypothesis. Secondly, though, several other variables, notably Latitude and Rural Population, are much more statistically relevant to the change of the dependent variable; these are counter to my second hypothesis, as they are more significant than the FHR. Lastly, it is interesting to note that GDP per capita and Official Development Assistance, both monetary variables, were not statistically relevant predictors of the IMR.

Table 2: Healthcare Spending

Dependent Variable	Independent Variable	Unstandardized Coefficient	Standard Error
<b>Healthcare Spending</b>	<b>Freedom House Rating</b>	-0.632***	(.110)
	<b>GDP per Capita<sup>†</sup></b>	-0.0416	(.000)
	<b>Latitude</b>	0.034*	(.013)
	<b>Presence of Political Violence</b>	0.731	(.451)
	<b>Rural Population</b>	0.005	(.009)
	<b>Official Development Assistance per Capita</b>	0.002**	(.001)
		$R^2$	0.263
		F	11.83

\* $p < .01$ ; \*\* $p < .005$ ; \*\*\* $p < .001$

<sup>†</sup> The scale has been adjusted to make the result more understandable. The original regression was performed with a scale of \$1 USD, instead of \$1,000: the original regression coefficient was  $-4.16 \times 10^{-5}$



Next comes Healthcare Spending (HCS). Three of the independent variables have significant multiple-regression coefficients: Freedom House Scores, Latitude, and Official Development Assistance. FHR's coefficient was negative: as a country's score falls 1 point (more democratic), Healthcare Spending rises by 0.63% of GDP. The other two, Latitude and ODA, have positive multiple-regression coefficients. As latitude increases 1 degree (one degree farther from the equator), the percentage of GDP spent on healthcare rises 0.034%, while as ODA increases by \$1, it rises by 0.002%. However, this regression has a relatively low  $R^2$  value of 0.263: the model does not fit this data as clearly and consistently as the other two regressions, but .263 is still an acceptable level for political science research.

This regression has important implications. First, the Freedom-House Rating is a highly statistically relevant predictor ( $p < .001$ ). This is especially noteworthy, considering that it is the only independent variable to have that level of significant correlation among this regression. Indeed, this result is incredibly interesting because Healthcare Spending is the only variable that shows the immediate actions of governments: the other two dependent variable measures show longer-term consequences of those actions. This supports my first hypothesis well, showing that more democratic countries invest significantly more in their healthcare and healthcare systems. Also, it is important to mention that Latitude, again, pops up as statistically relevant predictor of a healthcare system indicator. A country's latitude, according to the model, is a statistically relevant predictor of how much a country spends on healthcare. It could simply be a reflection of the fact that European countries, which spend lots on healthcare, are all at fairly high

latitudes: however, the fact that latitude consistently pops up as significant in all the tests is notable.

Table 3: Physician Density

Dependent Variable	Independent Variable	Unstandardized Coefficient	Standard Error
Physician Density	Freedom House Rating	0.034	(.041)
	GDP per Capita <sup>†</sup>	0.0196***	(.000)
	Latitude	0.042***	(.005)
	Presence of Political Violence	-0.109	(.168)
	Rural Population	-0.019***	(.004)
	Official Development Assistance per Capita	.000016	(.000)
		R <sup>2</sup>	0.668
		F	62.125

\*p<.01; \*\*p<.005; \*\*\*p<.001

Lastly, Physician Density (PD). Three independent variables have significant multiple-regression coefficients: GDP per Capita, Latitude, and Percentage of Rural Population. GDP and LAT have positive coefficients: a \$1,000 raise in GDP/capita correlates to a 0.0196 rise in physician density, while a 1 degree change in Latitude leads to a 0.042 rise. Rural population correlates negatively: with every percentage rise of population living in rural areas, the Physician density falls .019. It should be noted that the R<sup>2</sup> value for this test is extremely high, at .668, especially considering that this is in the field of political science.

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<sup>†</sup> The scale has been adjusted to make the result more understandable. The original regression was performed with a scale of \$1 USD, instead of \$1,000: the original regression coefficient was  $1.96 \times 10^{-5}$

This regression has interesting implications for the conclusion. First, FHR, the Main Independent Variable, was not significantly correlated to PD, the indicator of the depth and pervasiveness of the healthcare system. This result does not support my hypothesis: one would assume that as countries become more democratic, they would provide more opportunities for their citizens to access physicians. Secondly, GDP shows up here as highly significant; in the other two indicators, it did not have any significant correlation. This is an interesting result: although GDP did not play a part in affecting healthcare outcomes, it does affect the depth and pervasiveness of the system. Lastly, Rural Population shows up as highly significant: this makes sense, as rural populations generally have a lower density of goods and services.

## **Analysis**

The results of the three regression analyses together, as hoped, have clear implications for the hypothesis put forward earlier in this paper. First, it is clear that democracy is a fairly statistically relevant predictor of a better healthcare system, supporting my first hypothesis. For two of the three health-related dependent variables, the statistical test is clear that there is a significant relationship. Indeed, HCS, the only dependent variable measure that measures government action, instead of long-term consequences, is affected by FHR with a high significance. Secondly, though, other competing variables are clearly equally or more statistically relevant than the Freedom House score. Rural Population correlates with two of the three health indicators as well, and, surprisingly, latitude was the only factor significant in all three variables. These variables tend to be more of a measure of the conditions that people live in, rather than

government action. For instance, countries at lower latitudes (closer to the equator) are known for having more tropical diseases like malaria which clearly could impact health, while countries with higher percentages of rural population probably have larger percentages of their populations outside of social-service delivery networks that are more easily developed in densely-packed cities than in the more sparse countryside. This result does not support my second hypothesis, suggesting an opposite conclusion: that other factors instead of regime type are statistically more responsible for the health of countries' citizens. Third, presence of violence did not statistically explain variations in healthcare system indicators: although it meets the lowest criteria for significance on the IMR regression, its coefficients are on balance not significant predictors of either improvements or decays in healthcare systems. Lastly, it is important to note that the economic independent variables, GDP per capita and Official Direct Investment, did relatively poor jobs at explaining variations in healthcare systems. This is hugely contrary to expectations, as the effect of money on healthcare is perceived to be very large.

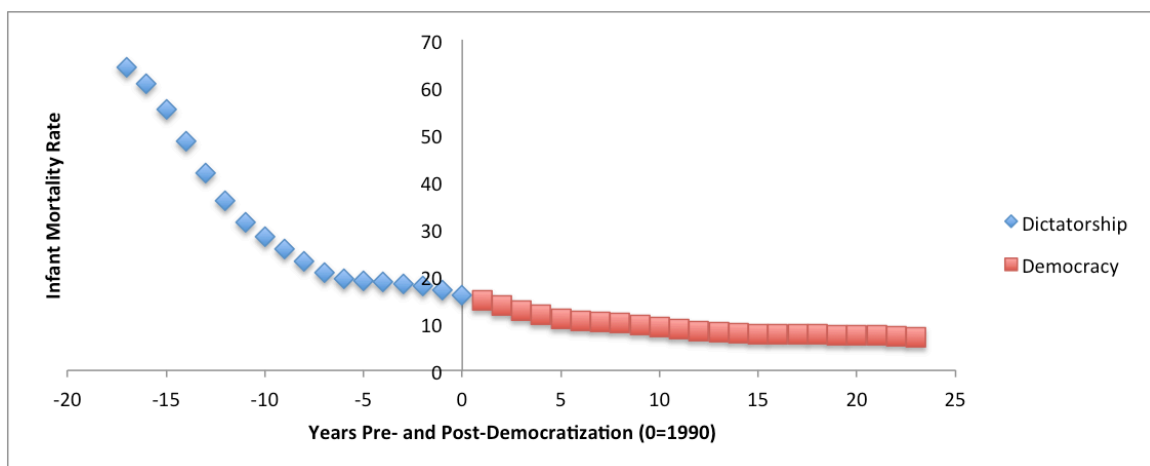
### **The Chilean Context**

While the benefit of conducting such a broad, international analysis is the breadth of political rights and civil liberties that can be analyzed, there is something lost: the depth of individual countries' experiences, represented in a more descriptive form than a one-year regression analysis. Thus, yet again, I will delve into the particular experience of Chile, as to add some depth to this discussion.

How did healthcare fare under the Pinochet regime as compared to the democratic government that followed it? There is very little data from before Chile's transition to

democracy in 1990. Indeed, having spent my semester abroad trying to find data sources for this thesis, it was hard to find any published data, governmental or otherwise, stretching farther back than 2000. However, one of my independent variable measures, Infant Mortality Rate, stretches all the way back to before the coup in 1973. Taking a look at this country-specific data in time series could provide a complimentary perspective on the regression analysis used above. If the results of my analysis above are consistent with Chile's experience, one would expect to see a noticeable decline in the IMR after Chile's government changed from dictatorship to democracy. However, one would also expect that other factors completely unrelated to regime type be at play. Before taking a look at the graph, it is important to note that this data and analysis are much less statistically developed than would be expected for a thesis: this is because I am simply offering this data as a complement to the conclusions reached from the more rigorous test performed above, rather than a fully new line of research into the topic.

Graph 1



As can be clearly seen in the graph, the Infant Mortality Rate falls much faster under Pinochet's regime as compared to the following democratic one. This does not necessarily mean that the Pinochet regime was more effective at providing care to its citizens than the democratic regime was: citing the *Encyclopedia of Infant and Early Childhood Development*, "infant mortality in developed countries first improved when standards of living increased and infectious disease mortality decreased. More recently, advances in obstetric and neonatal care for high-risk pregnancies and premature infants have reduced [it]" (Andrews et al. 2008, 343). That seems to have happened here: a swift downward slope in the IMR suddenly flattens out but still decreases, implying that further improvement in the IMR takes more technological advances and expensive equipment than previous advances. Even seeing this though, note the time of transition. Before the transition, the IMR almost completely levels out but, as the country crosses over into democracy, the IMR begins to have a slight, but noticeable, downward slope.

This result adds support to the results of the regression analysis. Regime type appears to be a factor: around the time of the transition to democracy, the IMR began a noticeable decline after years of stagnation. However, regime type is obviously less important than other factors in the provision and effectiveness of healthcare, as made obvious by the huge declines seen in the Pinochet years. Other factors, presumably urbanization and modernization, which were ongoing in Chile at the time and are consistent with the Rural Population indicator, are most likely more important in driving this change than regime type.

## **Conclusions**

### **Conclusion**

The results of my research speak clearly to my two hypotheses: there is a relationship between democracy and healthcare systems, confirming my first hypothesis, but, contrary to my second hypothesis, other factors, like latitude and percentage of rural population, were more consistently significant than democracy. This leads to several interesting conclusions. First, these results deepen the understanding of the relationship between democracy and health. As discussed in the literature review, several scholars have examined the relationship before, but most of these have used binary classifications that define regimes as either democracies or authoritarians. The results of this paper confirm this correlation between democracy and healthcare while, at the same time, doing so with a more fluid definition of democracy that puts regimes on a gradient between extremes of democratic and non-democratic regimes. This ensures that these conclusions extend not only to the poster-children of democracies and authoritarians, like Norway and North Korea, but to the countries in the gray area in-between the two that are neither fully democratic or fully authoritarian, like Venezuela or Nigeria.

Secondly, my results put into perspective this link between democracy and health. Although democracy was shown to be a significantly correlated with the dependent variable indicators, other indicators that reflect more immediate living conditions, like latitude and the percentage of rural population (conversely a measure of urbanization), are more significant. This suggests that improvements in health are more related to improvements in the conditions in which people live rather than changes in the economic or political conditions in a country. Lastly, the relatively low degree of correlation

between the economic competing variable indicators, GDP per Capita and Official Direct Investment, is surprising and somewhat counter-intuitive. This result is extremely surprising: given the impact that wealth is expected to have in healthcare, the absence of a significant relationship between these and both infant mortality rate and the money spent on healthcare flies in the face of the way one would expect the world to work. Further research would be needed to confirm these findings and put them into perspective and this result is by no means definitive, but it could lead to an interesting dialogue on the importance of wealth in healthcare.

These results logically lead to new perspectives on the improvement of healthcare on a global scale. First, it adds one more benefit to democracy in the realm of citizen welfare. Democracies have long been noted to correlate with many positive indicators like higher GDP, but their statistically significant relationship to healthcare-related factors like infant mortality and healthcare spending add one more benefit to improving political liberties and civil rights. However, the fact that environmental variables like latitude and percentage of rural population are more statistically relevant leads to the logical conclusion that efforts to improve the ecological and infrastructural conditions in which people live, like combating tropical diseases and increasing access to clean sources of water, will more efficiently improve healthcare than giving foreign aid or prompting regime change. This leads to a new perspective on the literature cited in the literature review. Although democracies have higher levels of social spending and are more responsive to citizen demands, other factors, like improving the conditions in which people live, are more important in improving healthcare.



## **Latin American Implications**

This study has huge implications for Latin America as well. First, it reinforces the importance of regime type. If democracy is a statistically relevant predictor of better healthcare systems, then one would expect that democratization in the region would lead to better health for citizens. In a region that has routinely witnessed non-democratic governance of all types, from military dictatorships to semi-authoritarian states with non-competitive elections, this is one more reason to demand real development and protection of political rights and civil liberties. Secondly, because the most significant results of this analysis were those that measured, among other things, the natural and infrastructural environment in which people live, this study confirms that huge gains in healthcare can be gained even without changing the regime type of countries. Cheap but effective efforts to combat tropical diseases and increasing access to infrastructure, two elements of the Latitude and Percentage of Rural Population indicators, can be gained without changing the regime (even though democratic governments would theoretically prioritize these objectives). Lastly, monetary variables were by-and-large less significant than regime-type and environmental variables. A direct application of this would be a larger emphasis on US policy being concerned with helping directly build infrastructure and increase access to healthcare, rather than giving non-specific aid to poorer countries.

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